

Prevalence of dental caries among school children of Bharatpur city, India

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Abstract

Background: Healthy teeth and oral tissues and the need for oral health care are important for any section of society. Dental caries is an infectious microbial disease of multifactorial origin in which diet, host, and microbial flora interacts over a period of time in such a way so as to encourage demineralization of the tooth enamel with resultant caries formation. Dental caries, the product of man's progress towards civilization, has a very high morbidity potential and thus, is coming into focus of the mankind. **Aims and Objectives:** To assess the prevalence of dental caries among 12-15 year old government and private school children of Bharatpur city. **Materials and Methods:** This was a cross-sectional study carried out on total 1400 school children, of which 700 school children were from government schools and 700 were from private schools. Simple random sampling methodology was used to select the sample. The subjects were examined for dental caries according to WHO 1997 assessment form. Significant Caries Index was also used to assess the prevalence of dental caries. **Results:** The prevalence of dental caries was found higher among government school children, that is, 53%, when compared to private school children, that is, 47% and this difference was found to be statistically significant. The mean decayed, missing, and filled teeth were found to be higher in government school children (7.61 ± 2.86) as compared to private school children (4.76 ± 2.42). **Conclusion:** Dental caries was found to be the major public health problems among both the government and private school children of Bharatpur city, which need immediate attention. Regular dental checkups and practice of routine oral hygiene procedures will enable them to lead a healthier life.

Key words: Dental caries, school children, Significant Caries Index

INTRODUCTION

Oral health is an important component of general health, with dental caries affecting a person's ability to eat, speak or socialize.^[1] Dental caries is an infectious microbial disease of multifactorial origin in which diet, host, and microbial flora interacts over a period of time in such a way so as to encourage demineralization of the tooth enamel with resultant caries formation. Dental caries, the product of man's progress toward

civilization, has a very high morbidity potential and thus, is coming into focus of the mankind.^[2] The caries experience varies greatly among countries and even within small regions of countries. It varies with age, and sex, socioeconomic conditions, ethnicity, diet, medical conditions of the patient, oral hygiene practices, etc., and even within oral cavity all the teeth and surfaces are not equally susceptible to caries.^[3] It not only causes pain and discomfort, but also in addition, leads to a financial burden. The prevention of dental caries has long been considered as an important task for the health professionals. Scientists are continuing their research in identifying the best practices for diagnosis, treatment, and prevention of dental caries. Previous methods for the treatment of dental caries in a surgical manner has being replaced by newer strategies that emphasize disease prevention and conservation of tooth structure.^[4] Voluminous literature exists on the status of the dental caries in the Indian population. It

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has been observed that in 1940 the prevalence of dental caries in India was 55.5%, and in 1960 it was reported to be 68%. Overall the general impression is that dental caries has increased in prevalence and severity in urban and cosmopolitan population since last two decades. However, there is no definite picture as yet regarding the disease status in rural and backward areas of country in the comparison where 80% of the population inhabits.^[4,5] A very extensive and comprehensive National Health Survey conducted in 2004 throughout India has shown dental caries prevalence as follows: 51.9% in 5-year-old children, 53.8% in 12-year-old children and 63.1% in 15-year-old teenagers. The report concluded that a preventive program, such as water fluoridation, should be started to address this national crisis in dental caries.^[6]

The scenario is different in developed countries where in recent years rapid changes have occurred in the prevalence of oral diseases. In the past decade, a substantial decline in dental caries has occurred among children of several developed countries mainly USA and several European countries.^[7,8] Fluoride has been recognized as one of the most influential factor responsible for the observed decline of caries among children as well as adults of these countries.

The Bharatpur city comes under Bharatpur block which in turn comes under Bharatpur tehsil of Bharatpur district in the state of Rajasthan.^[9] Since, no study showing the prevalence of dental caries has been done in this region and to recommend various preventive measures the present study was undertaken to know the prevalence of dental caries among 12-15 years old school children of Bharatpur city.

MATERIALS AND METHODS

A cross-sectional study was carried out in Bharatpur city to assess the prevalence of dental caries among school children in the age group of 12-15 years. List of schools was obtained from Bharat Shiksha Adhikari Office of Bharatpur, which comprised of 200 schools present in Bharatpur city, making a population of 105,000. Of these 105,000 students, 25,000 students of age group 12-15 years were included in the study.^[10]

A pilot study was carried out in order to test the feasibility and the sample size was estimated to be 1400 school children (700 governments and 700 privates). The Bharatpur city had been divided into five zones, that is, central, north, south, east, and west. Areas representing each zone were New Mandi

Chauraha, Ranjeet Nagar, Gopalgarh road, Kumher Gate and Surajpol Gate respectively. Zone I, that is, New Mandi Chauraha (central zone) had 40 schools, Zone II, that is, Ranjeet Nagar (north) had 52 schools, Zone III, that is, Gopalgarh road (south zone) had 35 schools, Zone IV, that is, Kumher Gate (east zone) had 35 schools and Zone V, that is, Surajpol (west zone) had 38 schools.

To obtain the total sample size of 1400, 280 school children from each of the five zones were randomly selected out of which 140 school children were from government schools and 140 were from private schools. Selection of schools from each zone had been done using simple random sampling (lottery) method ($280 \times 18 = 1400$). The structured pretested proforma was used to assess dental caries in the school children of Bharatpur city that included information related to gender, age and brushing frequency. Clinical examinations included dental caries examination using WHO standard criteria as mentioned in WHO Oral Health Proforma, 1997^[11] and Significant Caries Index (SiC) was also used to assess the prevalence of dental caries.^[12] The clinical examination was carried out by a trained examiner who was initially trained in the Department of Public Health Dentistry. He was supervised by an expert clinician and 96% agreement ($k = 0.96$) was found in their results. The ethical clearance was approved from the Ethical Committee of K.D. Dental College and Hospital, Mathura prior to the start of the study and consent was obtained from school authorities as well as from parents of school children. The inclusion and exclusion criteria were as follows.

Inclusion criteria

- School children aged 12-15 years
- School children who were residents of Bharatpur city (lifelong).

Exclusion criteria

- Individuals suffering from systemic illness
- Individuals who were not willing to participate in the study
- Individuals with orthodontic brackets and with severe extrinsic stains on their teeth.

The statistical analysis was performed using SPSS version 15(IBM Corporation). The mean and standard deviation of scores were calculated, comparison between government and private school children was done using Chi-square test, $P \leq 0.05$ was considered as statistically significant.

RESULTS

A cross-sectional study was carried out in Bharatpur city to assess the prevalence of dental caries among school children in the age group of 12-15 years. The distribution of study population according to gender, age, brushing frequency and SiC are given in Tables 1-4.

In this study, the mean decayed, missing, filled teeth (DMFT) among the government school children was higher, that is, 7.61 ± 2.86 when compared to private school children, that is, 4.76 ± 2.42 and a statistically significant difference, that is, $P \leq 0.05$ ($P = 0.000$) was observed when dental caries among government and private school children was compared [Table 5]. The prevalence of dental caries was found higher among government school children, that is, 53%, when compared to private school children, that is, 47% and this difference was found to be statistically significant [Table 6].

DISCUSSION

Healthy teeth and oral tissues and the need for oral health care are important for any section of society. Oral disorders can have a profound impact on the quality-of-life. Good oral health has real health gains, in that it can improve general health and quality-of-life and contribute to self-image and social interaction. Epidemiologic studies may be of value in assessing the prevalence of diseases, in disclosing trends in disease development, and in analyzing possible factors influencing the disease pattern.^[13]

In this study, among the total 1400 (100%) study subjects, 745 (53.2%) were boys and 655 (46.8%) were girls. Among both government and private schools maximum school children were boys, that is, 360 (51.4%) and 385 (55%) respectively, which is in accordance to the study conducted by Adekoya-Sofowora *et al.*^[14]

Maximum number of school children, that is, 387 (27.6%) were from the age group of 15 years which is in accordance with the study conducted by Pontigo-Loyola *et al.*^[15] in which maximum number of school children belonged to the age group of 15 years, that is, 850 (55.3%).

In this study, a maximum number of children, that is, 1176 (84%) brushed once in a day. These results are in accordance with the study conducted by Shailee *et al.*^[16] among both government and private school children in which also a maximum number of children, that is, 620 (52.9%) brushed once in a day.

Table 1: Distribution of study population according to gender among government and private school children

Gender	Government (%)	Private (%)	Total (%)
Boys	360 (51.4)	385 (55)	745 (53.2)
Girls	340 (48.6)	315 (45)	655 (46.8)
Total	700 (100)	700 (100)	1400 (100)

Table 2: Distribution of study population according to age among government and private school children

Age (years)	Government (%)	Private (%)	Total (%)
12	154 (22)	208 (29.8)	362 (25.9)
13	154 (22)	140 (20)	294 (21)
14	182 (26)	175 (25)	357 (25.5)
15	210 (30)	177 (25.2)	387 (27.6)
Total	700 (100)	700 (100)	1400 (100)

Table 3: Distribution of study population according to frequency of brushing teeth among government and private school children

Frequency of brushing	Government (%)	Private (%)	Total (%)	P value (%)
No cleaning	70 (10)	42 (6)	112 (8)	0.001*
Once	574 (82)	602 (86)	1176 (84)	
Twice	56 (8)	56 (8)	112 (8)	
Thrice	0 (0)	0 (0)	0 (0)	
Total	700 (100)	700 (100)	1400 (100)	

* $P \leq 0.05$ = Statistically significant

Table 4: Distribution of study population according to significant caries index

Dental caries	Total
Significant caries index	3.47

Table 5: Distribution of study population according to comparison of dental caries among government and private school children

Dental caries	Government (N=700)	Private (N=700)	Total (N=1400)	P value
Decayed (D)	3.61 ± 1.91	2.75 ± 1.97	2.92 ± 1.97	0.000*
Missed (M)	1.10 ± 1.53	0.90 ± 0.74	0.82 ± 0.95	0.000*
Filled (F)	2.90 ± 2.23	1.11 ± 0.78	1.48 ± 2.10	0.000*
Total (D+M+F)	7.61 ± 2.86	4.76 ± 2.42	5.22 ± 2.68	0.000*

* $P \leq 0.05$ = Statistically significant

In the total study population, 5.22 ± 2.68 was the mean DMFT. Among the government and private school children, 7.61 ± 2.86 and 4.76 ± 2.42 was the mean DMFT observed, respectively. In the study conducted by Wyne *et al.*^[17] 2.92 ± 3.51 was the mean DMFT. Among the government and private school children,

Table 6: Distribution of study population according to comparison of dental caries with type of school

Type of school	N (%)			P value
	Caries free	Caries positive	Total	
Government	350 (53.2)	350 (47)	700 (50)	0.0281*
Private	658 (100)	742 (100)	1400 (100)	

* $P \leq 0.05$ = Statistically significant

2.85 ± 3.41 and 3.05 ± 3.72 was the mean DMFT observed, respectively.

In this study, 742 (100%) were caries positive, out of which 392 (53%) were government school children and 350 (47%) were private school children. In the study conducted by Piovesan *et al.*^[18] of 141 (100%) caries positive school children, 86 (61%) were government school children and 55 (39%) were private school children.

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